

AMENDMENTS**In the Claims**

1.(canceled)

2.(canceled)

3.(canceled)

4.(canceled)

5.(canceled)

6.(canceled)

7.(canceled)

8.(canceled)

9.(canceled)

10.(currently amended) A composition comprising a polymerizing agent including a molecular and/or atomic tag covalently bonded to a site on the polymerizing agent and a monomer including a molecular and/or atomic tag, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the monomer tag and where the changes in the detectable property generate data evidencing each monomer incorporation producing a monomer sequence read out.

11.(canceled)

12.(canceled)

13.(previously presented) The composition of claim 10, wherein the polymerizing agent is a polymerase or reverse transcriptase.

14.(previously presented) The composition of claim 13, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

1 15.(previously presented) The composition of claim 13, wherein the reverse transcriptase
2 comprises HIV-1 reverse transcriptase.

1 16.(previously presented) The composition of claim 10, wherein each of the monomers
2 comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the
3 β or γ phosphate group of each dNTP.

1 17.(previously presented) The composition of claim 10, wherein the tags comprise fluorescent
2 tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent
3 light.

1 18.(previously presented) The composition of claim 17, wherein the fluorescence property is
2 fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag
3 comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two
4 tags are in close proximity.

5 19.(previously presented) The composition of claim 14, wherein the polymerase comprises *Taq*
6 DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the
7 *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-
8 518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

20.(canceled)

21.(canceled)

22.(canceled)

22.(canceled)

23.(canceled)

24.(canceled)

1 25.(withdrawn) A single molecule sequencing apparatus comprising a substrate having a first
2 chamber in which at least one tagged polymerase is confined therein and a second chamber including
3 tagged dNTPs and a channel interconnecting the chambers, where a detectable property of at least

4 one tag undergoes a detectable change during a monomer incorporation cycle.

1 26.(withdrawn) The apparatus of claims 24, further comprising a plurality of monomer
2 chambers, one for each tagged dNTP.

1 27.(withdrawn) A mutant Taq polymerase comprising native Taq polymerase with a cysteine
2 residue replacement at a site selected from the group consisting of 513-518, 643, 647, 649 and 653-
3 661 and mixtures or combinations thereof.

1 28.(withdrawn) The polymerase of claim 27, wherein the cysteine residue includes a tag
2 covalently bonded thereto through the SH group.

1 29.(withdrawn) A system for retrieving stored information comprising:
2 a unknown nucleotide sequence representing a data stream;
3 a single-molecule sequencer including a polymerase having a tag associated therewith and
4 monomers for the polymerase, each monomer having a tag associated therewith;
5 an excitation source adapted to excite the at least one of the tags; and
6 a detector adapted to detect a response from at least one of the tag,
7 where the response changes during polymerization of a complementary sequence and the
8 changes in response represent a content of the data stream.

1 30.(withdrawn) A system for determining sequence information from a single molecule
2 comprising:
3 a unknown nucleotide sequence;
4 a single-molecule sequencer comprising a polymerase having a tag associated therewith and
5 monomers for the polymerase, each monomer having a tag associated therewith;
6 a excitation source adapted to excite at least one of the tags; and
7 a detector adapted to detect a response from at least one of the tags,
8 where the response changes during polymerization of a complementary sequence and the
9 changes in the response represent the identity of each nucleotide in the unknown sequence.

1 31.(currently amended) A method for sequencing a molecular sequence comprising:
2 supplying an unknown sequence of nucleotides or nucleotide analogs to a single-molecule
3 sequencer comprising a polymerase having a fluorescent donor covalently attached thereto and
4 monomers for the polymerase, each monomer having a unique fluorescent acceptor covalently
5 bonded ~~thereto to the beta or gamma phosphate thereof~~;
6 exciting the fluorescent donor with a light from an excitation light source;
7 detecting emitted fluorescent light from the acceptor during a monomer incorporation cycle
8 via a fluorescent light detector, where an intensity and/or frequency of the emitted light for the
9 incorporating acceptors changes during each monomer incorporation cycle; and
10 converting the changes into an identity of each nucleotide or nucleotide analog in the
11 unknown sequence.

1 32.(withdrawn) A method of sequencing an individual nucleic acid molecule or numerous
2 individual molecules in parallel including the steps of:
3 immobilizing a member of the replication complex comprising a polymerase including a tag
4 attached thereto, a primer or a template sufficiently spaced apart to allow resolution detection of each
5 complex on a solid support;
6 incubating the replication complex with cooperatively-tagged nucleotides, each nucleotide
7 including a unique tag at its gamma-phosphate, where each nucleotide can be individually detected;
8 detecting each nucleotide incorporated by the polymerase as the polymerase transitions
9 between its open and closed form, which causes a change in a detectable property of at least one of
10 the tags or as the pyrophosphate group is released by the polymerase; and
11 relating the changes in the detectable property to the sequence of nucleotides in an unknown
12 nucleic acid sequence.

1 33.(withdrawn) A γ -phosphate modified nucleoside comprising γ -phosphate modified dATP,
2 dCTP, dGTP and dTTP.

1 34.(withdrawn) A primer sequence or portion thereof selected from the group consisting of
2 Sequence 1 through 29.

35.(canceled)

36.(canceled)

37.(canceled)

38.(canceled)

39.(canceled)

40.(canceled)

41.(canceled)

42.(canceled)

43.(canceled)

44.(canceled)

45.(canceled)

46.(canceled)

47.(canceled)

48.(canceled)

1 49.(canceled)

1 50.(new) A composition comprising a polymerizing agent including a molecular tag covalently
 2 bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a
 3 molecular tag covalently bonded to the β or γ phosphate group of the dNTP, where at least one of
 4 the tags has a fluorescence property that undergoes a change before, during and/or after each of a
 5 sequence of monomer incorporations due to an interaction between the polymerizing agent tag and
 6 the monomer.

1 51.(new) The composition of claim 50, wherein the polymerizing agent is a polymerase or
 2 reverse transcriptase.

1 52.(new) The composition of claim 51, wherein the polymerase is selected from the group
 2 consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment
 3 from *E. coli* DNA polymerase I.

1 53.(new) The composition of claim 51, wherein the reverse transcriptase comprises HIV-1
2 reverse transcriptase.

1 54.(new) The composition of claim 50, wherein the tags comprise fluorescent tags and the
2 fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

1 55.(new) The composition of claim 54, wherein the fluorescence property is fluorescence
2 resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises
3 a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in
4 close proximity.

5 56.(new) The composition of claim 52, wherein the polymerase comprises *Taq* DNA
6 polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq*
7 DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518,
8 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.